Video Camera Specifications

Fixed Position Camera

IP67 / 35X Optical Zoom Requirement

Alabama DOT
Qualified Products List

April 2009

Fixed Position Camera

1.01 MANUFACTURER

A. The specified product shall be manufactured by a firm whose quality system is in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM.

2.02 SYSTEM DESCRIPTION

A. The specified product herein shall be a high quality IP67 video camera system **(VCS)** integrating high resolution day/night camera technology with hi-power zoom lens optics, housed within a sealed and dry nitrogen pressurized enclosure package with a sunshield cover.

B. The (VCS) shall include an advanced ID generator for displaying camera site, preset and maintenance status information on the video image.

C. The (VCS) system shall include multiple camera manufacture communication protocols without using additional plug-in converter modules.

D. The (VCS) shall allow for a unique non-volatile device address range from 1 to 223 configurable thru serial communication using a graphical user interface. Hardware type settings are not acceptable.

E. The (VCS) shall be designed for use in harsh operational environments conforming to NEMA TS2 requirements for temperature range, power variations, shock and vibration as well as IP67 environmental standards.

F. The (VCS) shall be fully assembled, tested and pressurized at the original manufacturing facility and shipped as a complete unit.

2.03 PRODUCT SPECIFICATIONS

The IP67 camera system shall meet or exceed the following design and performance specifications.

A. **CAMERA MODULE**

1. Image Sensor: Interline transfer Progressive Scan Sony Ex-View CCD with mosaic-type color compensating filter.
2. Sensor Size: ¼" Format 3.6mm (H) x 2.7mm (V)
3. Image Resolution: 540 horizontal; 350 vertical
4. Picture Elements (total) 811 (H) x 508 (V)
5. Video Output: NTSC, 1 V p-p @ 75 ohms, unbalanced.
6. Maximum Lens Aperture: f/1.4 (wide) to f/4.2 (tele)
7. Optical Zoom Range: 35X, 3.4mm to 119mm
8. Digital Zoom Range: 1X (Off) through 12X, Smooth transition from Optical to Digital Zoom
9. Effective Digital Focal Length: 119mm to 1190mm

10. Optical Zoom Speed: Two speeds, from approximately 2.9 seconds to 5.8 seconds full range
11. Horizontal Angle of View: Optical: 55.8° to 1.7°; At 10X Digital: 55.8° to 0.17°.
12. Minimum Focus Distance: 40" in tele, 0.4" in wide angle.
13. Electronic Stabilization: Two-motion-frequency (5Hz or 16Hz) selectable stabilization method
14. Auto Focus: Selectable Auto/Manual; Minimum Scene Illumination for Reliable Auto Focus, 30% video
15. Manual Focus Speed: One speed, approximately 2.0 seconds to full range
16. Long Term Integration Range: Shall provide manual selection of integration duration for enhanced sensitivity. Integration times shall be 1/2 second, 1/4 second, 1/8 second, 1/15 second or 1/30 second. Frame Store video output provides continuous video output, updated at the integration rate.
17. Manual Shutter: Selectable shutter speeds shall be 1/60; 1/120; 1/180; 1/250; 1/500; 1/1,000; 1/2,000; 1/4,000; 1/10,000; 1/30,000 second
18. Auto Iris; Iris shall automatically adjust to compensate for changes in scene illumination to maintain constant video level output within sensitivity specifications.
19. Gamma: 0.45
20. AGC: 0 to 28 dB
21. Color Balance: Auto Tracking Color balance/Manual with adjustable Red and Blue Levels
22. Signal to Noise Ratio: >50 dB
23. Synchronization: Crystal or Phase-Adjust Line Lock on 60Hz.
24. Sensitivity: Scene Illumination @ F1.4
    a. 1.0 Lux @ 1/60 shutter, color mode
    b. 0.1 Lux @ ¼ shutter, color mode
    c. 0.01 Lux @ ¼ shutter, mono mode

C. **OPERATIONAL**

1. Presets; Minimum of 64, with each preset consisting of a zoom and focus coordinate.
2. Camera Site ID: Provide up to 2 lines of up to 24 ASCII characters each on video for user site description ID. If both lines are programmed, line 1 of ID shall always appear above line 2 regardless of top or bottom selection
3. Messages can be positioned at either the top or the bottom of display.
3. Low Pressure Indicator: Provide "Low Pressure" ID message on video for indication insufficient pressure in (VCS).

a. Message can be displayed in "blinking" or "non-blinking" mode
b. Message shall be enabled or disabled by user
c. Provide user threshold set points for variations in altitudes.

4. Internal Temperature Indicator: 1 line, in degrees C numeric messages can be displayed in "blinking" or "non-blinking" mode. Message shall be enabled or disabled.
5. Flash Memory: Update firmware and new features via RS422 serial communication channel.

G. I/O AND COMMUNICATION SIGNALS

1. Video; Provide for one analog 1 Vp-p unbalanced 75-ohm video output.
2. Control Data: Provide one (1) half duplex 4-wire RS422 channel for setup and system camera control functions.
   a. Protocol; The (VCS) shall provide Cohu, Pelco D, A/D, Vicon, and Bosch as a minimum, without using additional plug-in option cards.
   b. The (VCS) shall allow for up to 223 addresses, or the address range that the selected protocol supports.
   c. Transients; Provide minimum of two levels of protection with use of transorb and opto-isolated data transmission circuits.
3. Upon receipt of any given command, the camera shall not take longer than 1.0 second to respond.
4. All programmable functions shall be stored in non-volatile memory and shall not be lost if a power failure occurs.

H. POWER INPUT

The (VCS) system shall fully comply with and include independent laboratory test results confirming compliance with the following electrical operating conditions:

1. Power Consumption; <16 Watts Maximum
2. Operating Voltage; Per NEMA-TS2 para 2.1.2 and 2.1.3, 89 to 135Vac +/-3hz
   a. 24Vac shall be available on separate pins of the 18-pin connector.

I. MECHANICAL

1. Connectors: 18 Pin MS style PT06E-14-18S (SR) weatherproof non-corrosion type or equal
2. Weight; Maximum 5.5lbs
3. Dimensions: The (VCS) with sunshield shall be no larger than 15.0" long x 5" High x 5" wide.

4. Construction; Powder Coated extruded aluminum; all internal and external parts corrosion protected, stainless steel fasteners.
5. Camera Mount; Five threaded ¼" x 20 with 1" center and 1.75" center-to-center hole spacing.

J. **ENVIRONMENTAL**

The camera system shall fully comply with the following environmental operating conditions:

1. Temperature; Per Nema-TS2 para 2.1.5, -34C to 74C tested across low and high voltage ranges per Nema-TS2 para 2.1.2 and 2.1.3.
2. Vibration: Per Nema-TS2 para 2.1.9, 2.2.3, 5-30Hz sweep @ 0.5g applied in each of 3 mutually perpendicular planes.
3. Shock: Per Nema-TS2 para 2.1.10, 2.2.4, 10g applied in each of 3 mutually perpendicular planes.
4. Water Spray: Per IEC 60529+A1, 1999, Para 14.2.6, Solid water stream delivered thru 12.5mm nozzle @ 25 gallons/minute @ 9ft for 3 minutes
5. External Icing: Per Nema-TS2 250-2003, para. 5.6
6. Corrosion Protection; Per Nema 250-2003, para 5.10
7. Humidity; 0-100% N.C per MIL-E-5400T, para 3.2.24.4
8. Standards; IP66, IP67, ASTM-B117 Marine

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H. **CERTIFICATIONS**

1. Safety: CE
2. Emissions; FCC Class A

Day/Night Video Camera Specifications

Fixed Position Camera
IP67 With 30X Optical Zoom Requirement

Alabama DOT
Qualified Products List

March 2009

PRODUCTS

2.01 MANUFACTURER

A. The specified product shall be manufactured by a firm whose quality system is in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM.

2.02 SYSTEM DESCRIPTION

A. The camera system specified herein shall be a high quality camera system integrating high-resolution day/night camera technology with hi-power zoom lens optics, enclosed within a sealed and pressurized IP67 rated housing.

B. The camera shall be designed for use in adverse operational environments.

C. Communications protocol command set shall be public domain. The camera unit shall be fully assembled and tested at the original manufacturing facility and shipped as a complete unit.

2.03 PRODUCT SPECIFICATIONS

The camera shall meet or exceed the following design and performance specifications.

A. CAMERA MODULE

1. Image Sensor: Interline transfer Sony Ex-View CCD with mosaic-type color compensating filter.
2. Image Size: 1/4" Format 3.6mm (H) x 2.7mm (V) x 4.5mm
3. Image Resolution: 480 horizontal; 350 vertical Picture Elements (total) 811 (H) x 508 (V)
4. Video Output: NTSC, 1 V p-p @ 75 ohms, unbalanced.
5. Maximum Lens Aperture: f/1.6 (wide) to f/3.2 (tele)
6. Optical Zoom Range: 30X, 3.3mm to 99mm (+/-10%)
7. Digital Zoom Range: 1X (Off) through 10X, Smooth transition from Optical to Digital Zoom
8. Effective Digital Focal Length: 99mm to 990mm (+/-10%)
9. Optical Zoom Speed: Two speeds, from approximately 6.0 seconds to 16.0 seconds full range
10. Horizontal Angle of View: Optical: 58.0° to 2.2°; at 10X Digital: 58.0° to 0.22°.
11. Minimum Focus Distance: Default is 130cm (33"), Selectable distances of 10cm (3.9"), 50cm (19.7"), 80cm (130cm (31.5"), 2m (78.8"), 4m (157.6").
12. Auto Focus: Selectable Auto/Manual; Minimum Scene Illumination for Reliable Auto Focus; 50% video
13. Manual Focus Speed: One speed, approximately 5.0 seconds to full range
14. Selectable Long Term Integration Limit: Shall provide selection of the maximum integration duration for enhanced sensitivity. While long-term integration is active, Frame Store video output provides continuous video output, updated at the integration rate. The maximum Long Term Integration time shall be selectable from
    a. Approximately 1/30 second (2 fields)
    b. Approximately 1/15 second (4 fields)
    c. Approximately 1/8 second (8 fields)
    d. Approximately 1/5 second (12 fields)
    e. Approximately 1/4 second (16 fields)
    f. Approximately 1/2 second (32 fields)
    g. Approximately 1 second (64 fields)
    h. Approximately 2 seconds (128 fields)

15. Manual Shutter: Selectable shutter speeds shall be 1/60; 1/125; 1/250; 1/500; 1/1,000; 1/2,000; 1/4,000; 1/10,000
16. Auto Iris; Iris shall automatically adjust to compensate for changes in scene illumination to maintain constant video level output within sensitivity specifications.
17. Gamma: 0.45
18. Color Balance: Auto Tracking Color balance/Manual with adjustable Red and Blue Levels
19. Signal to Noise Ratio: >48 dB
20. Synchronization: Crystal
21. Sensitivity: Scene Illumination, Day Mode (color) 30 IRE
    a. 1.0 Lux @ 1/60 shutter,
    b. 0.05 Lux @ 1/4 sec shutter
22. Sensitivity: Scene Illumination, Night Mode (Mono) 30 IRE
    a. 0.2 Lux @ 1/60 shutter
    b. 0.01 Lux @ 1/4 sec shutter
    c. 0.001 Lux @ 2 seconds integration (128 fields)

B. OPERATIONAL

1. Addressing: 256 Programmable Addresses, 0 through 255 with "find address" capability.
2. Presets: 167 Zoom and Focus Presets
3. Camera Site ID: Provide up to 10 characters for user site description ID, displayed on lower left of image.
4. Day/Night Control:
    a. Auto, Color or Monochrome Modes
5. Zoom Control Functions:
    a. Zoom In/Out
    b. Lens speed (Fast/Slow) setting
    c. Zoom Range Setting (Start and End Points)
6. Digital Zoom Function:
    a. Allow setting maximum digital zoom range mode (OFF, 2x, 5x, 10x)
7. Backlight Compensation Modes:
    a. Normal (OFF), Level 1 or Level 2 compensation, with 5 selectable compensation areas.
8. White Balance Control:
    a. Auto, Manual (Blue/Red), Indoor, Outdoor Modes
9. Sharpness Control
    a. Edge sharpness control (0 to 15) where lower numbers represent softer edges
10. Mirror Image
    a. ON/OFF, where ON Inverts image horizontally

C. I/O SIGNALS

1. Video; Provide for one analog 1 Vp-p unbalanced 75-ohm video output.
2. RS422 Control Data; Provide one (1) half duplex 4 wire RS422 channel for setup and system camera control functions.
    a. Protocol; The 3220 series camera shall use a published protocol for system integration as required.
    b. Transients; Provide minimum of two levels of protection with use of Transorbs and opto-isolated data transmission circuits.
    c. Baud Rate; 9600
    d. Start Bit; 1
    e. Stop Bit; 1

f. Data Bits; 8
g. Parity; None

3. RS232C Control Data; Provide one (1) RS232C channel for setup and system camera control functions.
   a. Protocol; The camera shall use a published protocol for system integration as required.
   b. Transients; Provide minimum of two levels of protection with use of Transorbs and opto-isolated data transmission circuits.
   c. Baud Rate; 9600
   d. Start Bit; 1
   e. Stop Bit; 1
   f. Data Bits; 8
   g. Parity; None
   h. Flow Control; XON/XOFF, RTS, CTS are not supported.

D. **POWER INPUT**

The camera shall fully comply with the following electrical operating conditions;

1. MODEL w/12VDC:
   a. POWER (Without Heater Operating): 12VDC +/- 10%; 4 Watts Max
   b. POWER (With Heater Operating): 12VDC +/- 10%; 22 Watts Max
2. MODEL w/24V AC/DC:
   a. POWER (Without Heater): 24V AC/DC +/- 10%; 4 Watts Max
   b. POWER (With Heater): 24V AC/DC +/- 10%; 22 Watts Max
3. MODEL w/115VAC:
   a. POWER (Without Heater): 115VAC +/- 10%; 4 Watts Max
   b. POWER (With Heater): 115VAC +/- 10%; 22 Watts Max

E. **MECHANICAL**

1. I/O: One PT06E-14-18P (SR) environmental connector located on the rear panel
2. Weight: 5.5 lbs maximum with sunshield, no mount.
3. IP67 per EN 60529
4. Dimensions: 8" (L) x 3.5" (W) x 4.2" (H) (w/o Sunshield)
5. Weight: < 5 lbs maximum with sunshield, no mount.
6. Construction: Construction; Powder Coated 6061 T6 aluminum; all internal and external parts corrosion protected, stainless steel external screws.
7. Camera Mount: Five ¼-20 mounting nuts on the bottom of the housing.

F. **ENVIRONMENTAL**

1. The camera system shall fully comply with and include independent laboratory test results confirming compliance with the following environmental operating conditions:
   a. Temperature - Operating; -50C to 60C (across low to high voltage ranges)
   b. Temperature - Start-up; -30C to 60C (across low to high voltage ranges)
   c. Temperature - Storage; -30C to 60C
   d. Resistant to salt-air fog (1000 hours) per EN61000-6-3, EN60065, EN50130-4
   e. Humidity; 0-100% N.C. per MIL-E-5400T, para 3.2.24.4

G. **STANDARDS**

1. IP67/Nema 4X/ASTM-B117

H. **CERTIFICATIONS**

1. Safety; CE (Low Voltage)
2. Emissions; FCC Class A